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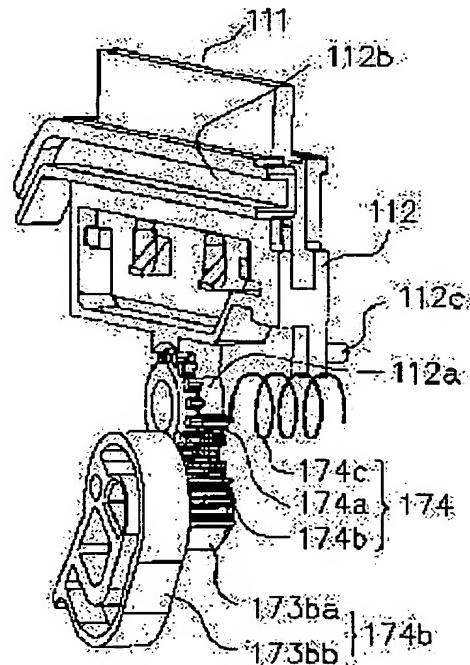
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(54) DEVICE FOR MAINTAINING HEAD DISCHARGE CHARACTERISTIC AND INK-JET PRINTER THEREWITH

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a device for maintaining head discharge characteristics which can cap and wipe by a simple constitution and by a stable operation at all times, and an ink-jet printer therewith.

SOLUTION: A driving means 170 rotates a wiping means 130 upwards when the wiping means wipes a printing head, and at the same time lowers and positions a capping means 110 to stop driving a suction means. When the capping means seals the printing head, the driving means 170 rotates the wiping means downward, and moves up and positions the capping means to drive the suction means. The driving means is provided with a friction clutch mechanism 174 for transmitting a driving force when the wiping means starts rotating and releasing the driving force when the wiping means ends rotating. The wiping means and the capping means can be thus held to constant positions and positioned highly accurately at all times.



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CLAIMS

[Claim(s)]

[Claim 1] In equipment which maintains the ink regurgitation property of a print head which carries out the regurgitation of the ink drop to a record medium When a wiping means to wipe away said print head, a capping means to close said print head, and said wiping means wipe away said print head While rotating said wiping means up, drop said capping means and it positions. Moreover, when said capping means closes said print head and attracts ink It has a driving means which said capping means is raised and is positioned while rotating said wiping means caudad. Said driving means Head regurgitation property retainer characterized by having a friction clutch device which tells driving force in case said wiping means carries out rotation starting, and misses driving force in case rotation **** is carried out.

[Claim 2] Head regurgitation property retainer according to claim 1 characterized by having a suction means to attract the inside of a cap of said capping means by which said print head is closed.

[Claim 3] Head regurgitation property retainer according to claim 1 or 2 characterized by carrying out a gear drive which used a toothless gear for the Nakama ** in said friction clutch device.

[Claim 4] Said wiping means and said capping means are the head regurgitation property retainer given in any 1 term of claims 1-3 characterized by the ability to return to a first stage-location, without using detection equipment from any location.

[Claim 5] Said friction clutch device is the head regurgitation property retainer given in any 1 term of claims 1-4 characterized by having two driving force means of communication and a press means which forces these driving force means of communication mutually, and uniting said one driving force means of communication with said wiping means.

[Claim 6] Said press means is head regurgitation property retainer according to claim 5 characterized by being the compression spring which forces said usual gear and usual toothless gear mutually at shaft orientations.

[Claim 7] Said wiping means is the head regurgitation property retainer given in any 1 term of claims 1-6 characterized by being attached in said capping means free [rotation].

[Claim 8] Said driving means is the head regurgitation property retainer given in any 1 term of claims 1-7 characterized by having a cam which has a toothless gear which transmits driving force of the midst which said wiping means rotates through said two driving force means of communication, and transmits driving force at the time of said capping means moving up and down.

[Claim 9] An ink jet printer characterized by equipping any 1 term of claims 1-8 with head regurgitation property retainer of a publication in an ink jet printer which has a print head which carries out the regurgitation of the ink drop to a record medium.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] This invention relates to the ink jet printer equipped with the head regurgitation property retainer which maintains the ink regurgitation property of the print head which carries out the regurgitation of the ink drop to a record medium in the fixed condition, and its head regurgitation property retainer.

[0002]

[Description of the Prior Art] It is constituted so that a print head may be moved to a main scanning direction, having the record-medium delivery means which sends intermittently record media, such as a print head carried in the carriage in which an ink jet printer generally carries out both-way migration in a main scanning direction, and a print sheet, the amount of setup every in the direction of vertical scanning, and sending a record medium in the direction of vertical scanning and the regurgitation of the ink drop may be carried out to a record medium from a print head.

[0003] Usually, one print head is carried in the ink jet printer of a mono-color. Moreover, in the full color ink jet printer, the print head for black ink which carries out the regurgitation of the black ink, and two or more print heads for color ink which carry out the regurgitation of the ink of each color, such as yellow, cyanogen, and a Magenta, are carried.

[0004] The nozzle orifice connected with a pressure generating room and it is prepared in the print head in the ink jet printer of such a configuration, and the regurgitation of the ink drop of the magnitude controlled towards the record medium from the nozzle orifice is carried out by storing ink in the pressure generating interior of a room, and pressurizing it by place constant pressure. Therefore, since the quality of a record image will be greatly influenced if the ink regurgitation property in the nozzle orifice of a print head is changed, an ink regurgitation property always needs to be maintained uniformly.

[0005] Adhesion, cellular mixing, etc. of a viscosity rise, solidification, the blinding by the solid, and also dust by evaporation desiccation of ink in a nozzle orifice become a cause, and this ink regurgitation property is changed. Therefore, the ink jet printer is equipped with the head regurgitation property retainer for eliminating each above-mentioned cause of fluctuation, and maintaining an ink regurgitation property in the fixed condition.

[0006] This head regurgitation property retainer is equipped with capping equipment, a suction pump, and wiping equipment. Capping equipment is constituted so that the nozzle forming face of a print head may be closed and a nozzle orifice may be isolated with the exterior at the time of un-recording, and it has the function to control evaporation desiccation of ink and to suppress a viscosity rise and solidification.

Moreover, since neither the blinding by the solid of a nozzle orifice nor mixing of the air bubbles into ink passage can be completely prevented even if it is closing the nozzle forming face with capping equipment, the suction pump is prepared in order to prevent them completely.

[0007] The suction pump is constituted so that negative pressure may be made to act on a nozzle orifice in the condition that capping equipment is closing the nozzle forming face, and it has the function to carry out suction discharge of the ink compulsorily from a nozzle orifice, and to remove a solid and air bubbles. Compulsory suction discharge processing of the ink by this suction pump is usually performed by place ** which operated the case where record actuation is resumed after a prolonged pause of an ink jet printer, and the exclusive switch which a user recognizes that the quality of a record image deteriorated and is in a

control panel.

[0008] Moreover, when compulsory suction discharge processing of the ink by the suction pump is performed, while ink may scatter and adhere to the nozzle forming face of a printer head, the meniscus of the ink in each nozzle orifice is confused. Furthermore, since a foreign matter tends to adhere to the nozzle forming face of a print head with time, the wiping equipment which wipes away a nozzle forming face if needed is formed.

[0009] Wiping equipment has the wiping member which a end face side becomes from elastic plates, such as rubber pinched with the electrode holder. And it is constituted so that double action may be carried out and a nozzle forming face may be cleaned. while forcing elastically a part for the edge by the side of the tip of this wiping member on a nozzle forming face --- relative --- **** --- Besides eradication of the ink adhering to a nozzle forming face, or a foreign matter, the meniscus of the ink in each nozzle orifice is prepared uniformly, namely, it has the function to stabilize.

[0010] Drawing 33 is the side elevation showing an example of the conventional head regurgitation property retainer. As shown in this drawing (a), the head regurgitation property retainer has the composition that capping equipment 1 and wiping equipment 2 shifted 90 degrees to the supporter 3 in which rotation and vertical movement are possible, and were arranged. And the toothless gear 4 is being fixed to the supporter 3, and the supporter 3 is arranged so that the toothless gear 4 may contact the cam 5 with loss of teeth. In addition, illustration is omitted although this head regurgitation property retainer is equipped with the suction pump.

[0011] In such a configuration, when closing the nozzle forming face of a print head and isolating a nozzle orifice with the exterior at the time of un-recording, as shown in this drawing (a), the head regurgitation property retainer is set so that a supporter 3 may be located in the topmost part by the cam 5 with loss of teeth, after capping equipment 1 has turned to the upper part.

[0012] And forcing elastically a part for the edge by the side of the tip of a wiping member on a nozzle forming face after record, relatively, **** and when carrying out double action and cleaning a nozzle forming face, as first shown in this drawing (b), the cam 5 with loss of teeth is rotated, gear-tooth 5a of the cam 5 with loss of teeth is engaged to the toothless gear's 4 gear-tooth 4a, and a supporter 3 is rotated with the toothless gear 4. And as finally shown in this drawing (c), the head regurgitation property retainer is set so that a supporter 3 may be located in the bottom by the cam 5 with loss of teeth, after wiping equipment 2 has turned to the upper part.

[0013]

[Problem(s) to be Solved by the Invention] Since the conventional head regurgitation property retainer mentioned above can be constituted from a simple device, it is effective. However, in order to have to rotate the whole head regurgitation property retainer, a large space will be needed for the perimeter, and the ink jet printer incorporated will be enlarged. Furthermore, the location precision of capping equipment 1 and a print head tends to get worse, and there is a possibility that capping may become imperfect.

[0014] Moreover, in the condition, i.e., the condition that the supporter 3 was located in the topmost part or the bottom, that capping equipment 1 or wiping equipment 2 was set, since the toothless gear's 4 gear-tooth 4a has not geared with gear-tooth 5a of the cam 5 with loss of teeth, a supporter 3 is in a free condition.

[0015] For this reason, there was a possibility that it might become difficult for a user to touch a supporter 3, to rotate a supporter 3, and to return capping equipment 1 or wiping equipment 2 to a position.

Moreover, when assembling the head regurgitation property retainer, exact phase doubling of the cam 5 with loss of teeth and the toothless gear 4 was needed, and there was a problem of taking time and effort.

[0016] This invention is made in view of the above various technical problems, and the purpose is in offering the ink jet printer equipped with the head regurgitation property retainer and it which can perform wiping and capping in the actuation always stabilized with the simple configuration.

[0017]

[Means for Solving the Problem] By head regurgitation property retainer concerning claim 1 of this invention, for the above-mentioned purpose achievement In equipment which maintains the ink regurgitation property of a print head which carries out the regurgitation of the ink drop to a record medium When a wiping means to wipe away said print head, a capping means to close said print head, and said wiping means wipe away said print head While rotating said wiping means up, drop said capping means and it positions. Moreover, when said capping means closes said print head and attracts ink It has a driving

means which said capping means is raised and is positioned while rotating said wiping means caudad. Said driving means In case said wiping means carries out rotation starting, driving force is told, and in case rotation *** is carried out, it is characterized by having a friction clutch device which misses driving force.

[0018] Thereby, since it is not necessary to rotate a capping means, the necessity of providing a space for rotation for the perimeter of a capping means is lost. Therefore, while being able to miniaturize an ink jet printer incorporated, location precision of a capping means and a print head is maintainable to high degree of accuracy. Moreover, since a friction clutch can be made for a wiping means to idle the upper part or after making it rotate caudad, a wiping means can always be positioned in a fixed location. Therefore, initializing a wiping means or assembling become easy.

[0019] In invention concerning claim 2, it is characterized by having a suction means to attract the inside of a cap of said capping means by which said print head is closed in head regurgitation property retainer according to claim 1. Since an ink drop adhering to a nozzle of a print head can be sucked up by this, a print quality is always maintainable in the condition of high degree of accuracy.

[0020] In invention concerning claim 3, it is characterized by carrying out a gear drive which used a toothless gear for the Nakama ** in said friction clutch device in head regurgitation property retainer according to claim 1 or 2. Thereby, a friction clutch device is realizable with simple structure.

[0021] In invention concerning claim 4, said wiping means and said capping means are characterized by the ability to return to a first stage-location, without using detection equipment from any location in head regurgitation property retainer given in any 1 term of claims 1-3. Even when a plug socket is pulled out accidentally, or unexpected interruption-of-service accident etc. arises working [an ink jet printer] by this and head regurgitation property retainer has stopped on the way, it can reset from the condition.

[0022] In invention concerning claim 5, in head regurgitation property retainer given in any 1 term of claims 1-3, a friction clutch device has two driving force means of communication and a press means which forces these driving force means of communication mutually, and is characterized by uniting said one driving force means of communication with said wiping means. Thereby, frictional force is generated between two driving force means of communication, and a friction clutch can be constituted.

[0023] In invention concerning claim 6, said press means is characterized by being the compression spring which forces said usual gear and usual toothless gear on shaft orientations mutually in head regurgitation property retainer according to claim 5. Thereby, a friction clutch device can be constituted from a simple device, and a manufacturing cost of head regurgitation property retainer can be reduced.

[0024] In invention concerning claim 7, said wiping means is characterized by being attached in said capping means free [rotation] in head regurgitation property retainer given in any 1 term of claims 1-6. It becomes easy for this to constitute a means to move a capping means up and down, and a means to rotate a wiping means, according to the same device. Therefore, head regurgitation property retainer can be used as a compact.

[0025] In invention concerning claim 8, said driving means is characterized by having a cam which has a toothless gear which transmits driving force of the midst which said wiping means rotates through said two driving force means of communication, and transmits driving force at the time of said capping means moving up and down in head regurgitation property retainer given in any 1 term of claims 1-7. Thereby, in a friction clutch, even if a big load which cannot respond is applied, a wiping means can be rotated smoothly. Moreover, since a means to move a capping means up and down, and a means to rotate a wiping means can be constituted from a simple machine part, positioning accuracy of each means can be raised and a maintenance cost and a manufacturing cost can be reduced.

[0026] In invention concerning claim 9, it is characterized by equipping any 1 term of claims 1-8 with head regurgitation property retainer of a publication in an ink jet printer which has a print head which carries out the regurgitation of the ink drop to a record medium. Thereby, an ink jet printer which does each above-mentioned operation so can be offered.

[0027]

[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained to details based on a drawing.

[0028] Drawing 1 is the perspective diagram showing the example of a configuration of the ink jet printer concerning the gestalt of operation of this invention, drawing 2 is the perspective diagram showing the example of a configuration of the head regurgitation property retainer concerning the gestalt of operation

of this invention by which unitization was carried out, drawing 3 is the perspective diagram which looked at the head regurgitation property retainer from the opposite side, and drawing 4 is the decomposition perspective diagram of the head regurgitation property retainer. The ink jet printer shown in drawing 1 is the large-sized printer by which for example, form width of face can print even to the print sheet of comparatively large-sized sizes, such as 594mm (A1 seal of JIS), and 728mm (B1 seal of JIS).

[0029] This ink jet printer is arranged toward this side under slant with the feed section 11, the Records Department 12, and a delivery unit 13 from the top. Printing predetermined in the process sent to the Records Department 12 and a delivery unit 13 from the feed section 11 is performed, and a print sheet is discharged outside. The form conveyance way 14 at the time of printing is formed with 65 inclinations to the horizontal plane. The nozzle forming face of the print head 18 carried in the carriage 17 which carries out both-way migration in accordance with the guide shaft 16 in a main scanning direction with a driving belt 15 is also inclined and arranged in 65 degrees so that it may become parallel to the form conveyance way 14.

[0030] The head regurgitation property retainer 100 for maintaining the ink regurgitation property of the print head 18 in the fixed condition is arranged by the portion used as the home position of carriage 17. And processing which maintains the ink regurgitation property of the print head 18 is performed by the head regurgitation property retainer 100 in the condition that carriage 17 is located in a home position.

[0031] The head regurgitation property retainer 100 is equipped with the driving means 170 which drives the wiping means 110, the capping means 130, the suction means 150, and them as shown in drawing 2, drawing 3, and drawing 4. In addition, at drawing 2, in order that the publication of a side frame 101 may be omitted and in order to show a internal structure, while it is shown in drawing 4 may show a internal structure in drawing 3, the publication of the side frame 102 of another side shown in drawing 4 is omitted, and by drawing 4, in order to simplify drawing, the publication of the suction means 150 is omitted.

[0032] The main scanning direction of the print head 18 where this head regurgitation property retainer 100 shows a nozzle forming face by the arrow head a of drawing 2 and drawing 3 if needed, In order to remove a wiping means 110 to wipe away in the so-called longitudinal direction, a capping means 130 to be forced on the nozzle forming face of the print head 18 at the time of un-recording, and to close a nozzle orifice, and the blinding and the mixed air bubbles of a nozzle orifice It drives in order to position the suction means 150 and the wiping means 110 which carry out suction discharge of the ink compulsorily, and the capping means 130 in a predetermined location. Moreover, the driving means 170 which drives the suction means 150 is arranged among the side frames 101 and 102 of two sheets, and unitization is mostly carried out to the cube type.

[0033] The wiping means 110 and the capping means 130 are installed in the main scanning direction of the print head 18 side by side, and the suction means 150 is installed in the direction of vertical scanning shown by the arrow head b of drawing 2 and drawing 3 to the wiping means 110 and the capping means 130. And the driving means 170 is arranged so that the wiping means 110, the capping means 130, and the suction means 150 can interlock. That is, rotate the wiping means 110 in the direction of vertical scanning, and it is made to move in the vertical direction which shows the capping means 130 by the arrow head c of drawing 2 and drawing 3 with the wiping means 110, and the driving means 170 is constituted so that the suction means 150 may be operated.

[0034] The wiping means 110 is equipped with the wiper 111, the wiper electrode holder 112, and the wiper cleaner 113 as shown in drawing 2, drawing 3, and drawing 4. The wiper 111 is formed in abbreviation rectangle plate-like of rubber. And a point is worn to the nozzle forming face of the print head 18. Thereby, a wiper 111 can wipe away the ink adhering to a nozzle forming face. In addition, depending on the class of ink, a wiper 111 may be formed with the felt or plastics.

[0035] The wiper electrode holder 112 is formed in abbreviation rectangle plate-like by plastics. And holding a wiper 111 in the form where the point of a wiper 111 projects from the upper limit section, it is prepared in the lower limit section and rotates in the direction of vertical scanning focusing on axial supporter 112a by which axial support is carried out in the 2nd cap electrode holder 133 of a capping means 130 to mention later. Thereby, the wiper electrode holder 112 can arrange a wiper 111 up at the time of use, and can arrange it caudad at the time of intact.

[0036] The wiper cleaner 113 is formed in the shape of a blade by plastics. And U character-like ink *** 113b is worn on both sides of a wiper 111 by the cross section established in the end section, rotating focusing on the other end by which axial support is carried out at the side frame 101 guide pin 113a

prepared in the end section being guided at guide slot 112b prepared in the wiper electrode holder 112. Thereby, the wiper cleaner 113 can scratch the ink adhering to a wiper 111.

[0037] The capping means 130 is equipped with the cap 131, the 1st cap electrode holder 132, and the 2nd cap electrode holder 133 as shown in drawing 2, drawing 3, and drawing 4. The cap 131 is formed in the shape of an abbreviation rectangular parallelepiped of rubber. And hollow 131a prepared in the upper part is forced on the nozzle forming face of the print head 18. Thereby, the capping means 130 can close a nozzle orifice.

[0038] The 1st cap electrode holder 132 is formed in the shape of an abbreviation rectangular parallelepiped by plastics. And holding cap 131 in the form where the rising wood of cap 131 projects from the upper surface, the spring which is not illustrated minds between the 2nd cap electrode holders 133, and projection 132a prepared in the side is stopped by pawl 133a of the 2nd cap electrode holder 133, and can move slightly in all the directions. Thereby, the 1st cap electrode holder 132 can force the rising wood of cap 131 according to the nozzle forming face of the print head 18, and can stick both certainly.

[0039] The 2nd cap electrode holder 133 is formed in the shape of an abbreviation rectangular parallelepiped by plastics. And it moves up and down with a wiper 111 and the wiper electrode holder 112, guide pin 133b prepared in the side being guided in the guide slots 101a and 102a established in both the side frames 101 and 102 holding the 1st cap electrode holder 132 to an upper limit side. Thereby, the 2nd cap electrode holder 133 can carry out positioning immobilization of the cap 131 in the upper part at the time of use, and positioning immobilization can be caudad carried out at the time of intact.

[0040] The suction means 150 is a common pulsating pump, by pushing continuously the fixed range of the tube T connected to the cap 131 with two or more rollers attached in the hand of cut at the fixed gap, sends out the air in a tube and carries out suction discharge of the ink of the print head 18 compulsorily. Thereby, the suction means 150 can remove the blinding and the mixed air bubbles of a nozzle orifice.

[0041] The driving means 170 is equipped with a driving force means of communication 171, the positive inversion change means 172, rotation / vertical-movement means 173, and the friction clutch device 174 as shown in drawing 2, drawing 3, and drawing 4. A driving force means of communication 171 is equipped with 2nd gear 171b arranged between both the side frames 101 and 102 while it is arranged in one on 1st gear 171a arranged so that it may come out to the outside of a side frame 101, this 1st gear 171a, and the same axle. 1st gear 171a is connected with the motor which was arranged in the outside of a side frame 101 and which is not illustrated. 2nd gear 171b is meshed with the gear 151 of the suction means 150 shown in drawing 2.

[0042] The positive inversion change means 172 is equipped with change arm 172a formed in the shape of abbreviation for L characters, and gear 172for normal rotation b and gear 172c for an inversion which were attached in each of that edge pivotable. It is pushed against 2nd gear 171b through the spring with which change arm 172a is inserted in the shaft of 2nd gear 171b, and a center section does not illustrate it. It is arranged so that either gear 172for normal rotation b or gear 172c for an inversion may gear with 2nd gear 171b by the hand of cut of 2nd gear 171b and it may gear by turns to toothless gear section 173aa of cam 173with gear a of a rotation / vertical-movement means 173 to mention later further.

[0043] Rotation / vertical-movement means 173 is equipped with two cams 173a and 173b with a gear arranged in the both ends of the same shaft. Each cams 173a and 173b with a gear have the composition that cam section 173ab and 173bb were united with toothless gear section 173aa and 173ba. As mentioned above, toothless gear section 173aa is arranged so that it may gear gear 172for normal rotation b of the positive inversion change means 172 and gear 172c for an inversion, and by turns, and toothless gear section 173ba is arranged so that it may gear with toothless gear 174a of the friction clutch device 174 mentioned later. And cam section 173ab and 173bb are arranged so that the two lower parts of guide pin 133b arranged in the lower both sides of the 2nd cap electrode holder 133 may be contacted, respectively.

[0044] The friction clutch device 174 is equipped with compression-spring 174c which forces mutually toothless gear 174a and the usual gear 174b which were arranged in one cam 173with gear b side, and toothless gear 174a and the usual gear 174b. Toothless gear 174a is really fabricated by axial supporter 112a of the wiper electrode holder 112. It is stuck to the usual gear 174b on toothless gear 174a and the same axle. And toothless gear 174a and the usual gear 174b are arranged so that it may gear with toothless gear section 173ba of cam 173with gear b. Compression-spring 174c is arranged so that toothless gear 174a and the usual gear 174b may be mutually forced on shaft orientations.

[0045] In addition, although this friction clutch device 174 shows the example equipped with toothless gear

174a, and usual gear 174b and compression-spring 174c, it should just be a friction clutch device equipped with the press means which is not limited to this and forces two driving force means of communication and these driving force means of communication mutually. That is, in case the wiping means 110 carries out rotation starting, driving force is told, and it can be used, if it is the friction clutch device which misses driving force in case rotation *** is carried out.

[0046] In such a configuration, the driving force of a motor is transmitted to the wiping means 110 through 1st gear 171a and 2nd gear 171b through toothless gear section 173ba of toothless gear section 173aa and cam 173with gear b of cam 173with gear a, toothless gear 174a, and the usual gear 174b from gear 172for normal rotation b by rotation of change arm 172a, or gear 172for inversion c.

[0047] Furthermore, it is transmitted to the wiping means 110 and the capping means 130 through cam section 173bb of cam section 173ab and cam 173with gear b of cam 173with gear a, and is transmitted to the suction means 150 through a gear 151. By this, the wiping means 110 can be rotated, the capping means 130 can be moved up and down with the wiping means 110, and the suction means 150 can be operated.

[0048] The details of the arrangement relation between the principal part of the wiping means 110 of the above configurations, the capping means 130, cam 173with gear b, and the friction clutch device 174 are explained with reference to drawing 5, and actuation of each means 110 and 130 is explained with reference to drawing 6 – drawing 21 after that. As shown in drawing 5, guide pin 133b prepared in the 2nd cap electrode holder 133 of the capping means 130 is inserted in the axial hole of axial supporter 112a prepared in the wiper electrode holder 112 of the wiping means 110.

[0049] And cam 173with gear b gears with gear 174b stuck to toothless gear 174a of the friction clutch device 174 in which toothless gear section 173ba is prepared in axial supporter 112a, and this toothless gear 174a, and it is arranged so that guide pin 133b by which cam section 173bb is prepared in the 2nd cap electrode holder 133 may be contacted. Thereby, the wiping means 110 can be rotated in the direction of illustration arrow head a, and the capping means 130 can move up and down in the direction of illustration arrow head b with the wiping means 110.

[0050] Next, although actuation of the wiping means 110 is explained with reference to drawing 6 – drawing 17, drawing 6 – drawing 9, drawing 10 – drawing 11, drawing 12 – drawing 14, drawing 15 – drawing 17 are drawings in which having changed the view into and having shown the same operating state among each drawing, respectively. That is, drawing 6 – drawing 9 show the condition in which wiping with a wiper 111 is possible, drawing 10 – drawing 11 show the condition in the middle of receipt of a wiper 111, drawing 12 – drawing 14 show the condition of the completion of receipt of a wiper 111, and drawing 15 – drawing 17 are drawings showing a condition when the wiping means 110 goes up with the capping means 130.

[0051] First, in the condition in which wiping with a wiper 111 is possible, as shown in drawing 6, a wiper 111 turns to the upper part, positioning immobilization is carried out and positioning immobilization of the wiper cleaner 113 is carried out at the end section side of the wiper electrode holder 112. These positioning immobilization is based on the following operations.

[0052] That is, as shown in drawing 6 and drawing 8, toothless gear section 173ba prepared in cam 173with gear b is in the condition of having not geared with toothless gear 174a of the friction clutch device 174, but having geared only with gear 174b. For this reason, since the driving force from toothless gear section 173ba is not transmitted to toothless gear 174a, but is transmitted only to gear 174b and will be in a skid condition, the wiper electrode holder 112 united with toothless gear 174a does not rotate, but it can turn a wiper 111 up and positioning immobilization can be carried out.

[0053] Moreover, as shown in drawing 6, guide pin 113a of the wiper cleaner 113 is inserted in guide slot 112b prepared in the wiper electrode holder 112 shown in drawing 6 and drawing 7. Thereby, since the wiper cleaner 113 will be positioned to the wiper electrode holder 112, positioning immobilization of the wiper cleaner 113 can be carried out at the edge side of the wiper electrode holder 112.

[0054] In addition, although drawing 9 is drawing showing the arrangement relation between guide pin 112c prepared in the wiper electrode holder 112 used as the guidance at the time of the wiper electrode holder 112 rotating, and guide slot 102b prepared in the side frame 102, in the condition at this time, i.e., the condition in which wiping with a wiper 111 is possible, both are separated and are not functioning.

[0055] Next, in the condition in the middle of receipt of a wiper 111, as shown in drawing 10, the wiper electrode holder 112 inclines and the wiper 111 is put between ink *** 113b of the wiper cleaner 113. This is based on the following operations. That is, when cam 173with gear b starts rotation, toothless gear

section 173ba of cam 173 with gear b rotates gear 174b of the friction clutch device 174, and toothless gear 174a currently pressed by coincidence by compression-spring 174c also makes it rotate according to frictional force.

[0056] Then, as shown in drawing 10 and drawing 11, toothless gear section 173ba gears to gear 174b and toothless gear 174a at coincidence. Thereby, in a friction clutch, even if the big load which cannot respond is applied, wiper electrode-holder 112 the very thing can be rotated smoothly. Furthermore, guide pin 113a of the wiper cleaner 113 is guided at guide slot 112b of the wiper electrode holder 112 at coincidence. Thereby, since ink *** 113b of the wiper cleaner 113 will be ground on both sides of a wiper 111, a wiper 111 can be contained, scratching the ink adhering to a wiper 111.

[0057] Next, in the state of the completion of receipt of a wiper 111, as shown in drawing 12, a wiper 111 turns to a slanting lower part, positioning immobilization is carried out and positioning immobilization of the wiper cleaner 113 is carried out at the other end side of the wiper electrode holder 112. These positioning immobilization is based on the following operations.

[0058] Namely, since gear-tooth 112ae of the edge of toothless gear 112a hits circle configuration 173bd of another side of toothless gear section 173ba of cam 173 with gear b when it is going to move a wiper 111 in the set direction as shown in drawing 12 and drawing 13, a wiper 111 cannot be moved in the set direction.

[0059] On the other hand, since guide pin 112c of an electrode holder 112 is equivalent to the left wall of guide slot 102a of a side frame 102 when it is going to move a wiper 111 in the reset direction as shown in drawing 14, a wiper 111 cannot be moved in the reset direction. Thereby, since the wiper electrode holder 112 will be positioned to cam 173 with gear b, and a side frame 102, a wiper 111 can be turned to a slanting lower part, and positioning immobilization can be carried out.

[0060] Moreover, as shown in drawing 12, guide pin 113a of the wiper cleaner 113 is displaced relatively to the other end side of the wiper electrode holder 112 along with guide slot 112b of the wiper electrode holder 112. Thereby, since the wiper cleaner 113 will be positioned to the wiper electrode holder 112, positioning immobilization of the wiper cleaner 113 can be carried out in the location which visited the endmost part by the side of the other end of the wiper electrode holder 112.

[0061] Finally, in the condition when the wiping means 110 goes up with the capping means 130, as shown in drawing 15 and drawing 16, a wiper 111 separates from cam 173 with gear b, positioning immobilization is carried out, with a slanting lower part turned to, and positioning immobilization of the wiper cleaner 113 is carried out at the other end side of the wiper electrode holder 112. These positioning immobilization is based on the following operations.

[0062] That is, as shown in drawing 17, when the cams 173a and 173b with a gear rotate, cam section 173ab of the cams 173a and 173b with a gear and 173bb push up guide pin 133b of the 2nd cap electrode holder 133 along the guide slots 101a and 102a of both the side frames 101 and 102.

[0063] Furthermore, as shown in drawing 17, guide pin 112c of the wiper electrode holder 112 enters into the vertical section of guide slot 102a of a side frame 102. Thereby, since the wiper electrode holder 112 will be positioned to the cams 173a and 173b with a gear, and a side frame 102, positioning immobilization can be detached and carried out from the cams 173a and 173b with a gear, turning a wiper 111 to a slanting lower part.

[0064] Moreover, as shown in drawing 15, guide pin 113a of the wiper cleaner 113 is displaced relatively to the location which visited the endmost part by the side of the other end of the wiper electrode holder 112 along with guide slot 112b of the wiper electrode holder 112. Thereby, since the wiper cleaner 113 will be positioned to the wiper electrode holder 112, positioning immobilization of the wiper cleaner 113 can be carried out in the location which visited the endmost part by the side of the other end of the wiper electrode holder 112.

[0065] Next, although actuation of the capping means 130 is explained with reference to drawing 18 – drawing 21, drawing 18 – drawing 19, drawing 20 – drawing 21 are drawings in which having changed the view into and having shown the same operating state among each drawing, respectively. That is, drawing 18 – drawing 19 show the condition that the cap 131 carried out the completion of receipt, and drawing 20 – drawing 21 are drawings showing the condition in which capping with cap 131 is possible.

[0066] First, after the cap 131 has carried out the completion of receipt, as shown in drawing 18 and drawing 19, positioning immobilization of the capping means 130 is carried out at the lowest edge. This positioning immobilization is based on the following operations. That is, as shown in drawing 18, toothless

gear section 173aa of cam 173 with gear a is arranged so that it may gear by turns in the location where gear 172b for normal rotation and gear 172c for an inversion shifted crosswise in toothless gear section 173aa by rotation of change arm 172a. And it is formed in the location where two toothless section 173ac (s) and 173ad shifted a hoop direction and crosswise at this toothless gear section 173aa.

[0067] As shown in drawing 18 and drawing 19, moreover, cam section 173ab of the cams 173a and 173b with a gear and 173bb It is formed in the abbreviation ellipse configuration. In the middle of a periphery Two guide pin 133b of the lower both sides of the 2nd cap electrode holder 133, Stopper 173ae in which 133b and contact are possible, and 173be are prepared, and guide slot 173af to which it shows two another guide pins 133c and 133c prepared in the 2nd cap electrode holder 133 along with a periphery, and 173bf are prepared in the lateral portion.

[0068] And when the capping means 130 arrives at the lowest edge from the maximum upper limit Cam section 173ab of the cams 173a and 173b with a gear, guide slot 173af of 173bb, 173bf(s) Two guide pin 133c of the 2nd cap electrode holder 133, 133c is moved and two guide pins 133b and 133b of the lower both sides of the 2nd cap electrode holder 133 are depressed at the lowest edge along the guide slots 101a and 102a of both the side frames 101 and 102.

[0069] Furthermore, gear 172c for an inversion started toothless section 173ad of toothless gear section 173aa of cam 173 with gear a, and has idled. Thereby, since the 2nd cap electrode holder 133 will be positioned to the cams 173a and 173b with a gear, and both the side frames 101 and 102, positioning immobilization of the capping means 130 can be carried out at the lowest edge.

[0070] Next, in the condition in which capping with cap 131 is possible, as shown in drawing 20 and drawing 21, positioning immobilization of the capping means 130 is carried out at the maximum upper limit. This positioning immobilization is based on the following operations. Namely, when the capping means 130 reaches the maximum upper limit from the lowest edge Cam section 173ab of the cams 173a and 173b with a gear and 173bb Two guide pins 133d and 133e of the 2nd cap electrode holder 133 are moved. Two guide pins 133b and 133b of the lower both sides of the 2nd cap electrode holder 133 are made the maximum upper limit along the guide slots 101a and 102b of both the side frames 101 and 102, and stopper 173ae and 173be are made to contact.

[0071] Furthermore, gear 172b for normal rotation started toothless section 173ac of toothless gear section 173aa of cam 173 with gear a, and has idled. Thereby, since the 2nd cap electrode holder 133 will be positioned to the cams 173a and 173b with a gear, and both the side frames 101 and 102, positioning immobilization of the capping means 130 can be carried out at the maximum upper limit.

[0072] Although the actuation equipped with the wiping means 110, the capping means 130, the suction means 150, and driving means 170 of the above configurations by the whole head regurgitation property retainer 100 is explained with reference to drawing 22 – drawing 31, the timing diagram drawing 22 indicates the example of the head regurgitation property retainer 100 of operation to be among each drawing, drawing 23 – drawing 25, drawing 26 – drawing 28, drawing 29 – drawing 31 are drawings in which having changed the view into and having shown the same operating state, respectively. That is, drawing 23 – drawing 25 show the condition in which wiping with a wiper 111 is possible, drawing 26 – drawing 28 show the condition of the completion of receipt of a wiper 111, and drawing 29 – drawing 31 are drawings showing the condition in which capping with cap 131 is possible.

[0073] In the case of normal rotation shown in drawing 22, as shown in drawing 23 – drawing 25, the capping means 130 is located in the lowest edge, and a "open" condition, i.e., the condition of having not carried out capping, has cap 131. Moreover, the wiping means 110 is located up and a wiper 111 is in the condition of a "set", i.e., the condition in which wiping is possible. Moreover, the roller of the pump which is the suction means 150 is in the condition of a "release", i.e., the condition of not drawing in, to a tube (initiation time t1).

[0074] If a motor drives in the normal rotation direction and rotates 2nd gear 171b with 1st gear 171a from this condition, change arm 172a will rotate and gear 172b for normal rotation will gear to toothless gear section 173aa of cam 173 with gear a. And the turning effort of 2nd gear 171b is transmitted to toothless gear section 173aa of gear 172 for normal rotation b to cam 173 with gear a, and the cams 173a and 173b with a gear rotate. Then, when toothless gear section 173ba of cam 173 with gear b rotates gear 174b of the friction clutch device 174 and toothless gear 174a currently pressed by coincidence by compression-spring 174c also makes it rotate according to frictional force, the wiper electrode holder 112 carries out rotation initiation (time t4).

[0075] And if engagement with toothless gear section 173 of cam 173 with gear b b and toothless gear 174a of the friction clutch device 174 separates, toothless gear 174a will idle and rotation of the wiper electrode holder 112 will stop it. At this time, as shown in drawing 26 – drawing 28, the wiping means 110 is located caudad and a wiper 111 is in the condition "under reset", i.e., the condition that the wiper 111 was contained, (time t5).

[0076] Furthermore, if the cams 173a and 173b with a gear rotate, the capping means 130 will carry out rise initiation with the wiping means 110 according to cam section 173ab of the cams 173a and 173b with a gear, and an operation of 173bb (time t6). And if gear 172b for normal rotation reaches toothless section 173ac of toothless gear section 173aa of cam 173 with gear a, since gear 172b for normal rotation will race, a rise of the capping means 130 and the wiping means 110 stops.

[0077] As this condition is shown in drawing 29 – drawing 31, the capping means 130 is located in the maximum upper limit, and a "close" condition, i.e., the condition of carrying out capping, has cap 131. Moreover, the wiping means 110 is located more nearly up than previously, and a wiper 111 is in the condition that the condition 111 "on reset", i.e., a wiper, is going up while it had been contained by it (time t7).

[0078] If a motor drives further in the normal rotation direction and rotates 2nd gear 171b with 1st gear 171a from this condition, the suction means 150 will operate. At this time, the roller of a pump is in the condition of "a lump [bite]", i.e., the condition of drawing in, to a tube (time t8, t9). In addition, while the wiping means 110 and the capping means 130 operate, power is transmitted to a pump.

[0079] On the other hand, in the case of the inversion shown in drawing 22, the capping means 130 and the wiping means 110 consider a reverse action as the above-mentioned actuation by gear 172c for an inversion. If the gear 151 shown in drawing 2 half-rotates, the pawl of a gear 151 will push the pawl of a disk 152, and a disk 152 will begin to rotate. The wiping means 110 and the capping means 130 have ended actuation in the meantime. however, the suction means 150 -- Time t -- it returns to the condition of a "release" by 3 and t4.

[0080] As mentioned above, according to the head regurgitation property retainer 100 of this operation gestalt, since the capping means 130 is not rotated, space effectiveness can be raised, the ink jet printer incorporated can be miniaturized, further, the location precision of the capping means 130 and a print head 18 can be raised, and capping can be performed certainly.

[0081] It seems that furthermore, as for the wiping means 110 or the capping means 130, location gap will not be caused even if a user touches the wiping means 110 and the capping means 130 since the wiping means 110 and the capping means 130 can be held in a fixed location according to an operation of the friction clutch device 174. Therefore, an activity to which the wiping means 110 and the capping means 130 are returned to a position becomes unnecessary, and since a situation which the components which constitute the wiping means 110 and capping means 130 grade collide and damage further is also lost, a maintenance becomes simple.

[0082] Moreover, since the wiping means 110 and the capping means 130 can always be positioned to high degree of accuracy, in case the head regurgitation property retainer 100 is assembled, the activity which carries out phase doubling of the components which constitute the wiping means 110 and capping means 130 grade correctly also becomes unnecessary. Therefore, the manufacturing cost of the head regurgitation property retainer 100 can be reduced.

[0083] In addition, although the operation gestalt mentioned above explained the head regurgitation property retainer 100 equipped with the capping means 130 and one suction means 150, it is not limited to this, and even if it is the head regurgitation property retainer 200 equipped with two capping means 130 and the suction means 150 as shown in drawing 32 for example, it can constitute similarly, and the same effect can be acquired.

[0084]

[Effect of the Invention] Since it is not necessary to rotate a capping means, as explained above, while being able to miniaturize the ink jet printer incorporated, the location precision of a capping means and a print head is maintainable [the necessity of providing the space for rotation for the perimeter of a capping means is lost, and] according to the ink jet printer equipped with the head regurgitation property retainer and it concerning this invention, to high degree of accuracy.

[0085] Moreover, since a friction clutch can be made for a wiping means to idle the upper part or after making it rotate caudad, a wiping means can always be positioned in a fixed location, and initializing a wiping

means or assembling become easy.

[Translation done.]

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

- [Drawing 1]** It is the perspective diagram showing the example of a configuration of the ink jet printer concerning the gestalt of operation of this invention.
- [Drawing 2]** It is the perspective diagram showing the example of a configuration of the head regurgitation property retainer concerning the gestalt of operation of this invention by which unitization was carried out.
- [Drawing 3]** It is the perspective diagram which looked at the head regurgitation property retainer of drawing 2 from the opposite side.
- [Drawing 4]** It is the decomposition perspective diagram of the head regurgitation property retainer of drawing 2 .
- [Drawing 5]** It is the perspective diagram showing the details of the arrangement relation between the principal part of the wiping means of the head regurgitation property retainer of drawing 2 , a capping means, and a cam with a gear.
- [Drawing 6]** It is drawing 1 showing actuation of the wiping means of drawing 5 .
- [Drawing 7]** It is drawing 2 showing actuation of the wiping means of drawing 5 .
- [Drawing 8]** It is drawing 3 showing actuation of the wiping means of drawing 5 .
- [Drawing 9]** It is drawing 4 showing actuation of the wiping means of drawing 5 .
- [Drawing 10]** It is drawing 5 showing actuation of the wiping means of drawing 5 .
- [Drawing 11]** It is drawing 6 showing actuation of the wiping means of drawing 5 .
- [Drawing 12]** It is drawing 7 showing actuation of the wiping means of drawing 5 .
- [Drawing 13]** It is drawing 8 showing actuation of the wiping means of drawing 5 .
- [Drawing 14]** It is drawing 9 showing actuation of the wiping means of drawing 5 .
- [Drawing 15]** It is drawing 10 showing actuation of the wiping means of drawing 5 .
- [Drawing 16]** It is drawing 11 showing actuation of the wiping means of drawing 5 .
- [Drawing 17]** It is drawing 12 showing actuation of the wiping means of drawing 5 .
- [Drawing 18]** It is drawing 1 showing actuation of the capping means of drawing 5 .
- [Drawing 19]** It is drawing 2 showing actuation of the capping means of drawing 5 .
- [Drawing 20]** It is drawing 3 showing actuation of the capping means of drawing 5 .
- [Drawing 21]** It is drawing 4 showing actuation of the capping means of drawing 5 .
- [Drawing 22]** It is the timing diagram which shows the example of the head regurgitation property retainer of drawing 2 of operation.
- [Drawing 23]** It is drawing 1 showing actuation of the head regurgitation property retainer of drawing 2 .
- [Drawing 24]** It is drawing 2 showing actuation of the head regurgitation property retainer of drawing 2 .
- [Drawing 25]** It is drawing 3 showing actuation of the head regurgitation property retainer of drawing 2 .
- [Drawing 26]** It is drawing 4 showing actuation of the head regurgitation property retainer of drawing 2 .
- [Drawing 27]** It is drawing 5 showing actuation of the head regurgitation property retainer of drawing 2 .
- [Drawing 28]** It is drawing 6 showing actuation of the head regurgitation property retainer of drawing 2 .
- [Drawing 29]** It is drawing 7 showing actuation of the head regurgitation property retainer of drawing 2 .
- [Drawing 30]** It is drawing 8 showing actuation of the head regurgitation property retainer of drawing 2 .
- [Drawing 31]** It is drawing 9 showing actuation of the head regurgitation property retainer of drawing 2 .
- [Drawing 32]** It is the perspective diagram showing another example of a configuration of the head regurgitation property retainer concerning the gestalt of operation of this invention by which unitization

was carried out.

[Drawing 33] It is the plan showing the example of the conventional head regurgitation property retainer of operation.

[Description of Notations]

100 Head Regurgitation Property Retainer

101 Side Frame

101a Guide slot

102 Side Frame

102a Guide slot

110 Wiping Means

111 Wiper

112 Wiper Electrode Holder

112a An axial supporter

112aa(s) Circle configuration

112ab(s) Circle configuration

112b Guide slot

113 Wiper Cleaner

113a Guide pin

113b Ink ****

130 Capping Means

131 Cap

131a Hollow

132 1st Cap Electrode Holder

132a Projection

133 2nd Cap Electrode Holder

133a Pawl

133b Guide pin

133c Guide pin

150 Suction Means

170 Driving Means

171 Driving Force Means of Communication

171a The 1st gear

171b The 2nd gear

172 Positive Inversion Change Means

172a Change arm

172b The gear for normal rotation

172c The gear for an inversion

173 Rotation / Vertical-Movement Means

173a A cam with a gear

173aa(s) Toothless gear section

173ab(s) Cam section

173ac(s) The toothless section

173ad(s) The toothless section

173ae(s) Stopper

173af(s) Guide slot

173b A cam with a gear

173ba(s) Toothless gear section

173bb(s) Cam section

173bc(s) Circle configuration

173bd(s) Circle configuration

173be(s) Stopper

173bf(s) Guide slot

174 Friction Clutch Device

174a A toothless gear

174b Gear
174c Compression spring
200 Head Regurgitation Property Retainer

[Translation done.]

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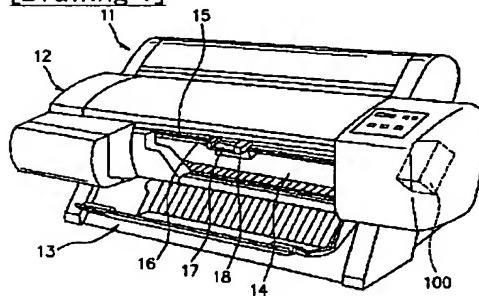
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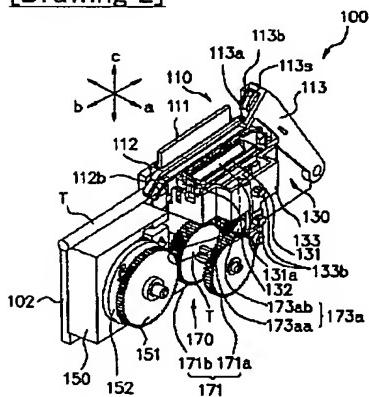
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DRAWINGS

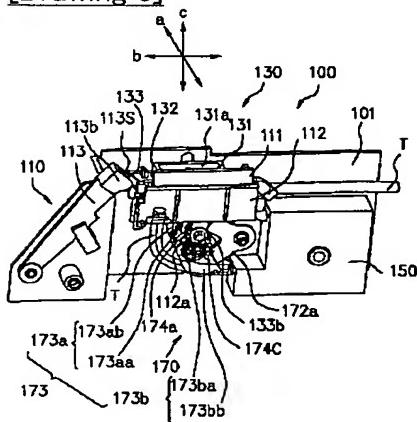
[Drawing 1]



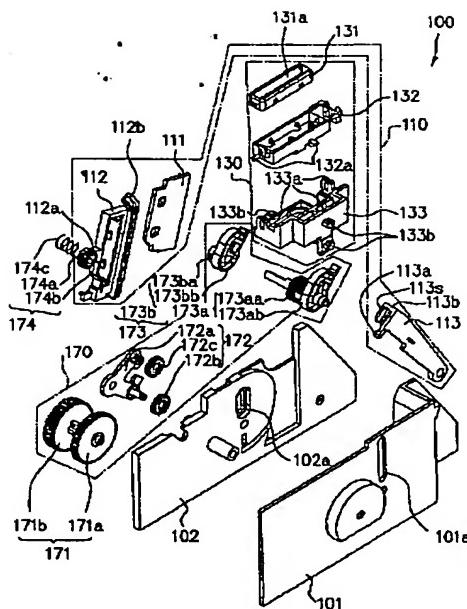
[Drawing 2]



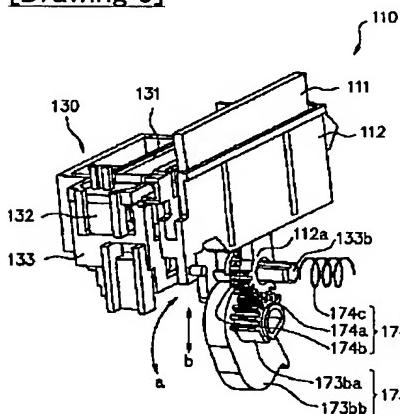
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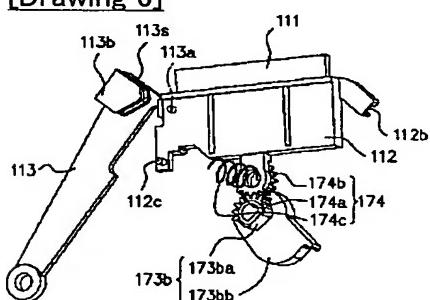
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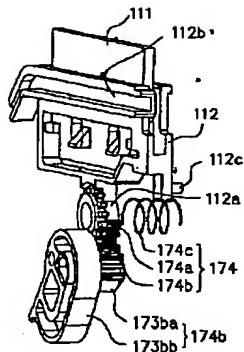
[Drawing 5]



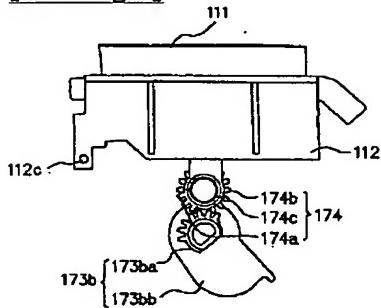
[Drawing 6]



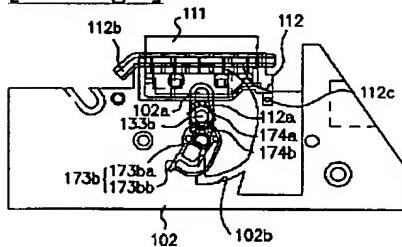
[Drawing 7]



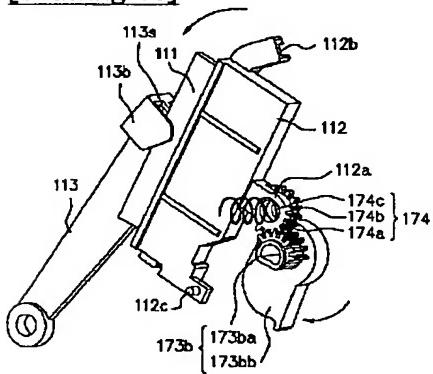
[Drawing 8]



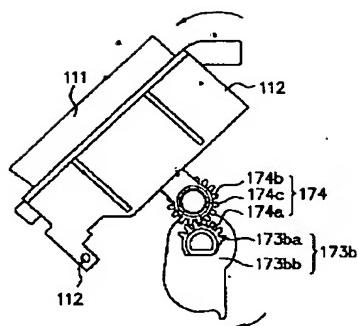
[Drawing 9]



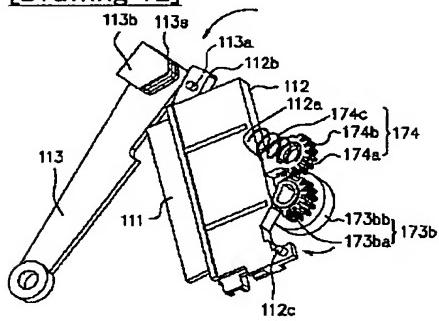
[Drawing 10]



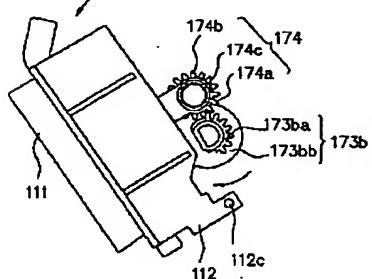
[Drawing 11]



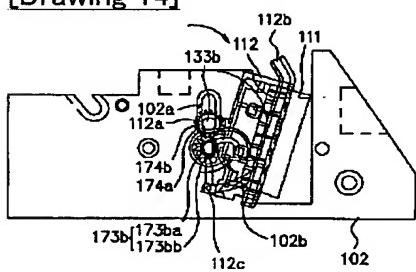
[Drawing 12]



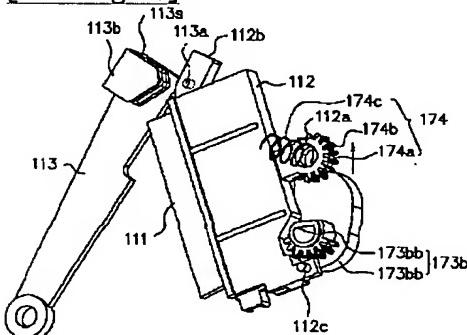
[Drawing 13]

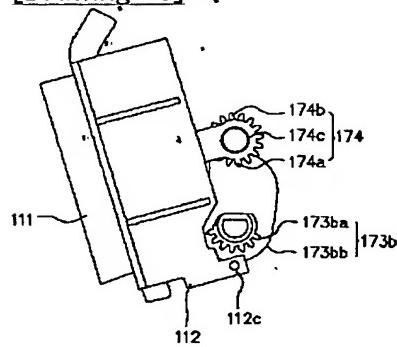
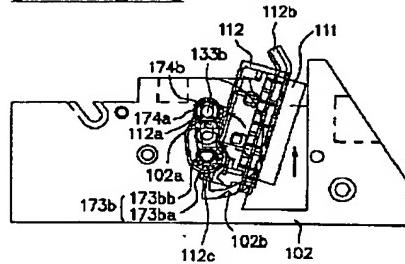
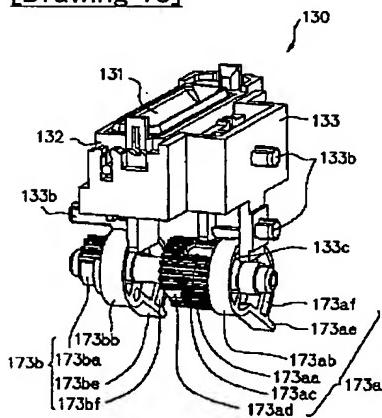
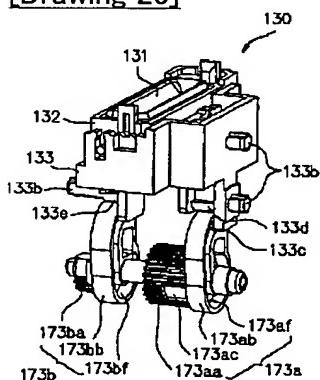


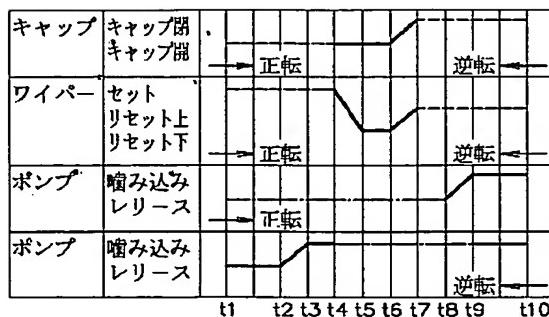
[Drawing 14]



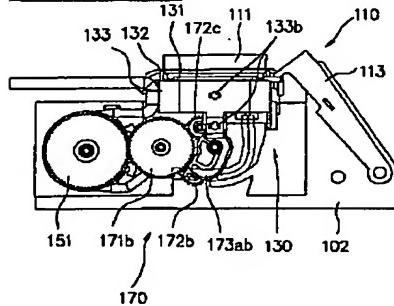
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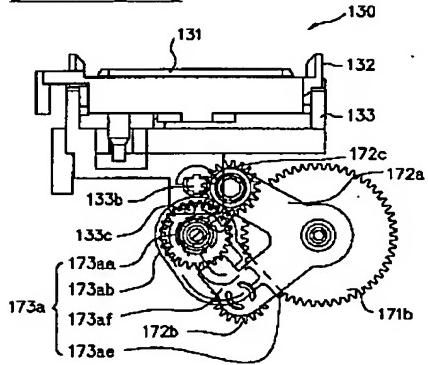
[Drawing 16][Drawing 17][Drawing 18][Drawing 20][Drawing 22]



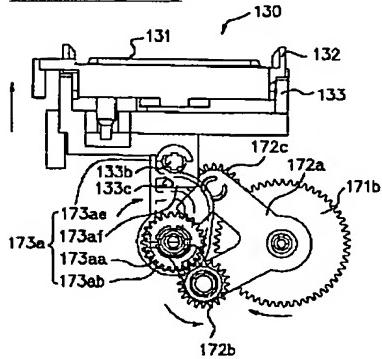
[Drawing 25]



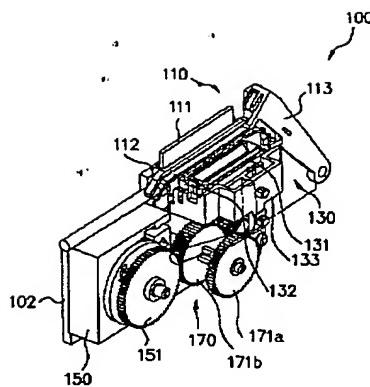
[Drawing 19]



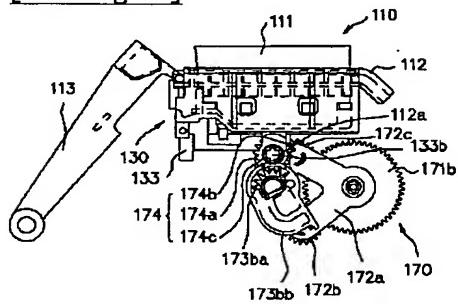
[Drawing 21]



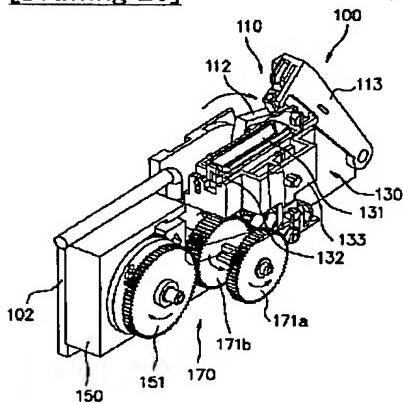
[Drawing 23]



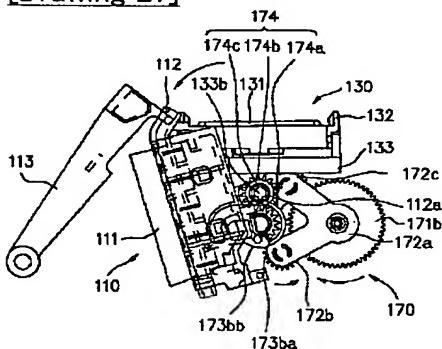
[Drawing 24]



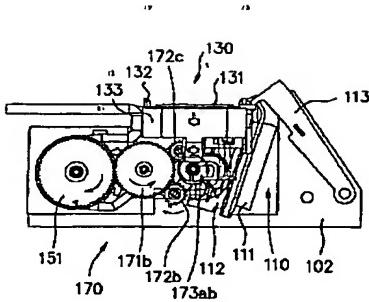
[Drawing 26]



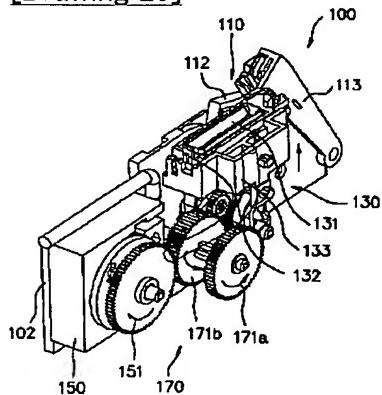
[Drawing 27]



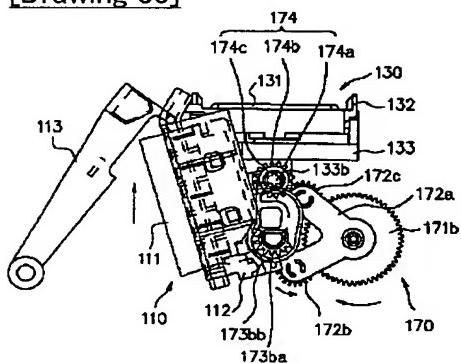
[Drawing 28]



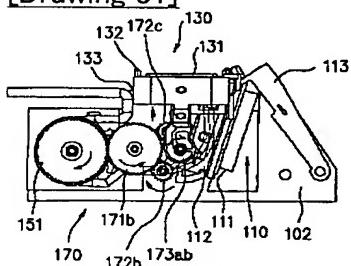
[Drawing 29]



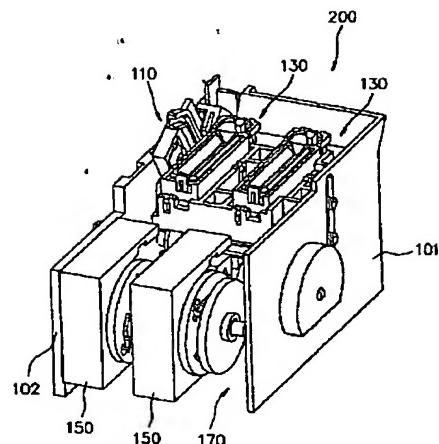
[Drawing 30]



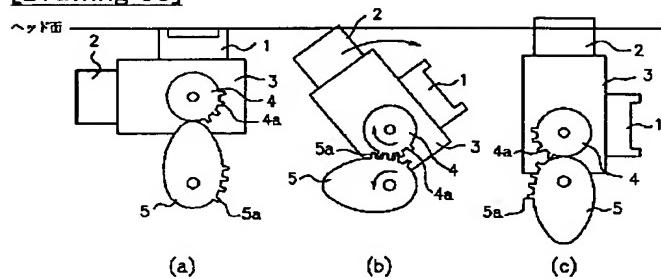
[Drawing 31]



[Drawing 32]



[Drawing 33]



[Translation done.]